

REMARKS

Claims 1 – 3, 6 – 8, and 9 – 19 are pending. Claims 1, 6, 11, and 17 have been amended. Claims 20 - 22 have been added. Claim 9 have been cancelled. No new matter has been added. The applicant respectfully requests reconsideration and reexamination of the application.

In the February 9, 2006 Office Action, the Examiner rejected claims 1 – 3, 6 – 14, and 16 – 19 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,985,594 to Vaudrey (“the Vaudrey reference”) in view of U.S. Patent No. 6, 587,565 to Choi (“the Choi reference”). The Examiner rejected claim 15 under 35 U.S.C. § 103(a) as being unpatentable over the Vaudrey reference in view of the Choi reference and further in view of U.S. Patent No. 5,569,038 to Tubman (“the Tubman reference”). These rejections are respectfully traversed in so far as they are applicable to the presently pending claims.

Claim 6, as amended, distinguishes over the cited references. Claims 6, as amended, recites:

A sound processing apparatus comprising:
a signal separator, that separates an input audio signal of at least one system into a plurality of separated signal components corresponding respectively to a plurality of different types of sound sources, the input audio signal containing an ambient sound component and an on-the-spot speech sound component, at least part of the plurality of separated signal components including the ambient sound component and the on-the-spot speech sound component, the signal separator including:
a harmonic component extraction part that extracts a frequency of on-the-spot speech sound from a frequency domain signal component of the input audio signal supplied thereto,
a sound source identification part that identifies a frequency component of the on-the-spot speech sound from the frequency domain signal component of the input audio signal supplied thereto,
an ambient sound spectrum envelope estimation part that estimates a frequency component of ambient sound of the input audio signal,
a spectrum subtraction part that obtains an on-the-spot speech sound component by subtracting the frequency component estimated by the ambient sound spectrum envelope estimation part from the frequency component output from the sound source

identification part, and
a spectrum subtraction part that obtains an ambient sound component by subtracting the on-the-spot speech component from the input audio signal supplied thereto;

a sound processor that subjects each of the ambient sound component and the on-the-spot speech sound component of the at least part of the plurality of separated signal components to individual sound processing suitable for the signal component, the sound processing on the ambient sound component including sound field control processing for creating a spatial impression of a sound with a presence; and

an output controller that outputs the plurality of separated signal components as at least one audio signal after each signal component of the at least part thereof is subjected to the individual sound processing.

The Vaudrey reference does not disclose, teach, or suggest the apparatus of claim 6, as amended. The Examiner states that the Vaudrey reference discloses a signal separator 309 for separating an input audio signal into a plurality of separated signal components 310 and 311, where the input audio signal includes an on-the-spot sound component (voice audio) and an ambient sound component (background audio). (*Office Action, pages 2 and 3*). Specifically, the Vaudrey reference discloses that a receiver 307 receives encoded program signals and demodulates the main carrier frequency from the encoded audio/video signals. Alternatively, in the case of recorded media, the heads from the VCR or the laser reader from a CD player 308 would produce the encoded audio/video signals. In either embodiment, the audio/visual signals are sent to a decoding system 309. The decoding system separates the signals into video, voice audio, and background audio using standard decoding techniques such as envelope detection in combination with frequency or time divisional demodulation. The background audio is sent to a separate variable gain amplifier 310 that the listener can adjust to his or her preference. The voice signal is sent to a variable gain amplifier and this can be adjusted to the listener's preference. The two adjusted signals are summed by a unity-gain summing amplifier to produce the final output. Alternatively, the two adjusted signals are summed by unity-gain summing

amplifier 312 and further adjusted by variable gain amplifier 315 to produce the final audio output. (*Vaudrey*, col. 9, line 48 – col. 10, line 10).

This is not the same as a sound processing apparatus including a signal separator, a sound processor, and an output controller, the signal separator including a **an ambient sound spectrum envelope estimation part that estimates a frequency component of ambient sound of the input audio signal**, a **spectrum subtraction part that obtains an on-the-spot speech sound component by subtracting the frequency component estimated by the ambient sound spectrum envelope estimation part from the frequency component output from the sound source identification part**, and a **spectrum subtraction part that obtains an ambient sound component by subtracting the on-the-spot speech component from the input audio signal supplied thereto**. The *Vaudrey* reference does not disclose that an ambient sound is captured and specifically does not disclose that the an estimation part estimates a frequency component of the ambient sound of the input audio signal. The Examiner states that background audio is the same as an ambient sound, but the applicant respectfully disagrees because background audio in the *Vaudrey* reference would be background music for the voice audio. In addition, assuming, *arguendo*, that the background audio was ambient sound, there is no mention in the *Vaudrey* reference that the frequency component of the background audio is estimated by an **ambient sound spectrum envelope estimation part**. Accordingly, applicant respectfully submits that claim 6, as amended, distinguishes over the *Vaudrey* reference.

Further, the *Vaudrey* reference does not disclose a sound processing apparatus including a **spectrum subtraction part that obtains an on-the-spot speech sound**

component by subtracting the frequency component estimated by the ambient sound spectrum envelope estimation part from the frequency component output from the sound source identification part, and a spectrum subtraction part that obtains an ambient sound component by subtracting the on-the-spot speech component from the input audio signal supplied thereto. The Vaudrey reference discloses only that the encoded voice audio and background audio are separated and does not disclose how the above-highlighted on-the-spot speech component and ambient sound component would be determined. Accordingly, applicant respectfully submits that claim 6, as amended, further distinguishes over the Vaudrey reference.

The Choi reference does not make up for the deficiencies of the Vaudrey reference. The Examiner states that the Choi reference discloses the sound processing of the ambient sound component including sound field control processing for creating a spatial impression of a sound with a presence and also discloses an output controller that outputs the plurality of separated signal components as at least one audio signal. (*Office Action, page 7*). The Choi reference discloses that left and right input signals are input to enhance a spatial effect and a directivity of sound in a reproduced sound. The left and right input signals are supplied to buffer amplifiers 10 and 20. The left input signal and the right input signal are input into the left and right side band enhancing portions, respectively, and into the left and right spatial effect enhancing portions, respectively. The output of the spatial effect enhancing portion is sent to the opposite matrix (e.g., output from the left spatial effect enhancing portion is sent to the right matrix.). The left input and the left output of the band enhancing portion are sent to the left matrix. The right input and the right output of the band

enhancing portion are sent to the right portion. This results in the original channel signals being enhanced in the lower frequency range, keeping them the same in the middle frequency range, and the mutually subtracted signals component of the original left and right channel signals are enhanced in the high frequency range. (*Choi, col. 4, line 8 – col. 5, lines 36*).

This is not the same as a sound processing apparatus including a signal separator, a sound processor, and an output controller, the signal separator including a **an ambient sound spectrum envelope estimation part that estimates a frequency component of ambient sound of the input audio signal, a spectrum subtraction part that obtains an on-the-spot speech sound component by subtracting the frequency component estimated by the ambient sound spectrum envelope estimation part from the frequency component output from the sound source identification part, and a spectrum subtraction part that obtains an ambient sound component by subtracting the on-the-spot speech component from the input audio signal supplied thereto.** There is no discussion in the Choi reference of ambient sound and also there is no disclosure that an ambient sound of an input signal is estimated. Instead, the Choi reference is directed to enhancing different frequency ranges of left and right input signals and it is not directed to operating on separated signals such as on-the-spot speech and ambient signals. Further, the Choi reference does not disclose how an on-the-spot speech sound component or an ambient sound component is generated because the Choi reference is directed to an entirely different invention. Accordingly, applicant respectfully submits that claim 6, as amended, further distinguishes over the Choi / Vaudrey combination.

The Tubman reference does not make up for the deficiencies of the Vaudrey and Choi references. The Examiner utilizes the Tubman reference to disclose that a sound processing apparatus changes pitch of each of the signal components. (*Office Action, page 8*). Assuming, *arguendo*, that the Tubman reference discloses all that the Examiner states that it does, the Tubman reference does not disclose a a sound processing apparatus including a signal separator, a sound processor, and an output controller, the signal separator including **an ambient sound spectrum envelope estimation part that estimates a frequency component of ambient sound of the input audio signal, a spectrum subtraction part that obtains an on-the-spot speech sound component by subtracting the frequency component estimated by the ambient sound spectrum envelope estimation part from the frequency component output from the sound source identification part, and a spectrum subtraction part that obtains an ambient sound component by subtracting the on-the-spot speech component from the input audio signal supplied thereto.** Accordingly, applicant respectfully submits that claim 6, as amended, further distinguishes over the Tubman / Vaudrey / Choi combination.

Claims 1 and 17, both as amended, recite limitations similar to claim 6, as amended. Accordingly, applicants respectfully submit that claims 1 and 17 distinguish over the Vaudrey / Choi / Tubman combination for reasons similar to those discussed above in regard to claim 6, as amended.

Claims 2 – 3, 7 – 8, 10 – 16, and 18 – 22, depend, indirectly or directly, on claims 1, 6, and 17. Accordingly, applicant respectfully submit that claims 2 – 3, 7 – 8, 10 – 16, and 18 – 22 distinguish over the Vaudrey / Choi / Tubman combination for the

same reasons as those discussed above in regard to claim 6.

Claim 22 further distinguishes over the cited references. Claim 22 recites:

The sound processing apparatus of claim 6, wherein the ambient sound spectrum envelope estimation part estimates a power variation of frequency characteristics based on an instantaneous power of the input audio signal and instantaneous power of a high frequency band signal component, and obtains a mean spectrum envelope of the ambient sound component based on stored spectrum envelope information and a spectrum envelope of the ambient sound signal obtained when a speech signal is determined to be absent, thereby estimating the frequency component.

None of the cited references (the Vaudrey, Choi, and Tubman references) disclose the estimation of ambient sound. Further, none of the cited references disclose that a power variation of frequency characteristics is estimated based on instantaneous power of the input audio signal and instantaneous power of the high frequency band signal component, as is recited in claim 22. Accordingly, applicant respectfully submits that claim 22 further distinguishes over the Vaudrey / Choi / Tubman combination.

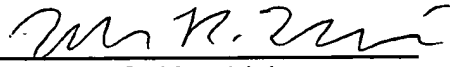
Claims 20 and 21 recite similar limitations to claim 22. Accordingly, applicant respectfully submits that claims 20 and 21 distinguish over the Vaudrey / Choi / Tubman combination for the reasons similar to those discussed above in regard to claim 22.

Applicant believes that the claims are in condition for allowance, and a favorable action is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the Examiner believe that such a telephone conference would advance prosecution of the application.

Respectfully submitted,

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